GENERAL GUIDELINES FOR CONDUCTING STREAM STUDIES FOR WASTEWATER DISCHARGES PROPOSED WITHIN FIVE MILES UPSTREAM FROM PUBLIC WATER SUPPLY SOURCES OR FOR THE LOCATION OF PUBLIC WATER SUPPLY INTAKES WITHIN FIVE MILES DOWNSTREAM FROM WASTEWATER DISCHARGES.

A. It is the policy of the Kentucky Division of Water to prohibit discharges from wastewater treatment plants into a stream, lake or impoundment within five (5) miles upstream from any public water supply intake and to prohibit the location of public water supply intakes within five (5) miles downstream of a wastewater discharge. Applications for permits to construct new wastewater treatment plants or to enlarge existing plants within this five mile limit will be denied unless a determination is made by the Division of Water that the proposed wastewater plant discharge will not significantly affect the quality of the water in the receiving stream at the downstream water intake. Approvals for new water treatment plants and applications for water withdrawal permits will be denied unless the Division of Water determines that the quality of water at the intake point is not significantly affected by an existing wastewater discharge within the five (5) mile limit.

B. In order to obtain a variance on the five mile limitation which would allow a construction permit to be issued for a new wastewater discharge or a new public water supply withdrawal, the following three requirements must be met in the order listed:

1. Preliminary approval to seek a variance must be granted to the applicant by the Division of Water.
2. The applicant must complete a detailed study of the stream segment in question. The study must be sufficient to satisfy the Division of Water that the water quality in the stream at the water intake point will not be significantly affected by the proposed discharge during worst case conditions, i. e., the 7 day 10 year low flow of the receiving stream and minimal wastewater treatment because of plant failure or emergency conditions.
3. The plans and specifications for the proposed wastewater treatment facility must incorporate design and reliability features as deemed necessary by the Division of Water based on the detailed stream study described above.

C. A plan of study shall be submitted to the Division of Water that describes:

1. The methodology to be used in the stream study.
2. The source and extent of existing data base for establishment of background conditions (quantitative & qualitative), or tentative plan to generate acceptable data base.
3. The parameters to be measured and the equipment to be employed for measurement and analysis.
4. The materials to be utilized in tracing the simulated discharge plume (fluorescent dyes, chlorides, radioisotopes, etc.) including estimates of maximum concentrations expected within the mixing zone and at the downstream water intake.
5. The means of simulating the actual discharge flow from the proposed plant.
6. The minimum flow at which study will be initiated and the mechanism for monitoring flow conditions in the interim.
7. The number of samples to be taken.
8. The distribution of stream sampling point locations over the stream

width and over the length of the reach to be monitored.
9. The frequency of collecting samples.
10. The capability of providing on-site testing equipment and analysis in the field and,
11. An estimate of the number of persons to be on site simultaneously for the duration of the study.

No field work on the stream study shall be initiated by the engineer until the detailed plan of study has been submitted, reviewed and accepted by the Division.

D. The scope of the proposed stream study must be sufficiently comprehensive to accomplish each of the following:

1. Since the study is intended to simulate the most critical conditions, i. e., the seven day ten year low flow condition in the receiving stream, together with a raw sewage discharge the study cannot be conducted during high stream flow or even average stream flow conditions. Since the study results will have to be extrapolated to the Q_{7-10} low flow condition, the study may have to be initiated in October or November or when the monitored stream flow is within the order of magnitude of the Q_{7-10} low flow range.
2. The test water flow discharged into the stream during the study must be sufficiently large to accurately simulate the design flow of the proposed new plant. This may be simplified when the discharge is to be made to a tributary of the main stream, if the study is conducted at a time when the main stream flow approximates the Q_{7-10} range and the tributary flow at this time approximates plant design capacity.
3. The sampling point distribution and collection frequency must be sufficient to define the mixing zone of the stream below the discharge and to describe the lateral dispersion of the simulated plant effluent in the receiving stream all the way to the water intake.
4. For treated sanitary sewage discharges, the critical parameter of concern in the simulation is the fecal coliform concentration arising from human sources. Some background fecal coliform analysis may be required within the discharge/intake reach and also upstream from the proposed discharge. For treatment plants proposed for non-sanitary (commercial/industrial) wastewater, the critical parameters of concern may be organic compounds (e. g. Endrin) and/or inorganic compounds (e. g. arsenic, metals) specified in the Kentucky Public and Semi-public Water Supplies Regulations (401 KAR 6:015). Background analyses and simulated discharge studies for these compounds must be planned accordingly.
5. Reasonably accurate hydraulic flow measurement of the receiving stream must be made continuously during the course of the study.
6. Data presented in the final engineering report must be actual data together with the simultaneous stream hydraulic flow data. No extrapolation to Q_{7-10} low flow conditions is to be made for the purpose of adjusting field data to be presented in the final report.

Richard Stogner
Director, Division of Water

December 15, 1983
Date